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DISEASES of the CHEST

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DISEASES OF THE CHEST

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(A MONTHLY PUBLICATION)

"The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind."

Lawrason Brown, M. D.

Editorial Comment

To Our New Readers

THIS ISSUE of the DISEASES OF THE CHEST publication will come to many readers for the first time. The journal is now nearing completion of its second year in the field of medical sciences. It is the aim and purpose of the editorial staff of DISEASES OF THE CHEST to bring to the busy physician short, concise articles on chest diseases written by specialists with long training in this branch of medicine.

The editorial policy of DISEASES OF THE CHEST is, *first,* the early diagnosis of chest diseases and, *second,* segregation of the open case of tuberculosis.

Our Motto: "CLOSE THAT CAVITY!"

You will find a special subscription offer on the back inside pages of this journal.

M. K.

New Trends in Prevention

IN RECENT years there has been a marked change of opinion as to the manner of infection and development of the disease which naturally influences our ideas of prevention. We do not have to go back far in literature to find many excellent clinicians contending that pulmonary tuberculosis depended upon childhood infection, usually taken by mouth, and that this later developed into active disease. The present trend of thought is well expressed by Levine, writing on childhood tuberculosis, when he states that in the vast majority of cases the organism enters the body by inhalation. Lawrason Brown further crystallizes modern thought when he says, "The view is gathering strength that in most all instances pulmonary tuberculosis is due to exogenous infection." Habbe, makes the interesting statement, "that those who on roentgenologic study shows normal lungs at 25 years of age or later are not apt to develop clinical pulmonary tuberculosis later." Landis, sums up the present when he states, "examine all contacts and trace the source of infection." C. M. H.

Cigarettes and Tuberculosis

THE USE OF CIGARETTES by tuberculous patients is the subject for dogmatic opinion on the part of physicians and sanatorium heads rather than for scientific discussion or painstaking clinical observation. The physicians opposed to smoking and favorable to it are often equally positive. In the main, however, medical men familiar with the treatment of the tuberculous will agree that cigarette smoking, with almost invariable inhaling, can do no good to the diseased lung and in many cases increases cough and is otherwise distinctly detrimental. Many physi-

cians decline to become the guardians of their adult patients. They give advice and leave it to the intelligence of the patient to carry out that advice. Some sanatorium heads declare that in dealing with grown persons, those determined to smoke will do so surreptitiously if they are not permitted to smoke openly and consequently the practice is tolerated in certain parts of the institution. Other institutions will not tolerate smoking under any circumstances and contend that if the patient is not capable of exercising the degree of self-discipline necessary in giving up cigarettes, his chances of recovery are not especially bright. Other patients must not be disturbed and possibly injured by the lack of self-control of the individual.

It is observed among presumably healthy individuals that, in spite of the comforting slogan "not a cough in a carload" there are often many coughs in a carton. In these individuals, cough and scattered rales will often disappear merely by stopping smoking. It is to be reasonably presumed that, if this is true, the inhalation of tobacco smoke must be generally irritating to the diseased lung. Certainly, in a serious matter like tuberculosis, it is better to deal with smoking as Mr. Punch dealt with matrimony when he advised "in case of doubt, don't."

What is said of men patients in this particular is especially true of women. In an experience of a quarter of a century of sanatorium management, the writer can recall few if any men, however long they had smoked, who did not give up the habit without serious discussion when told firmly that they could choose between their smoking and leaving the sanatorium. On the other hand, several women patients have expressed themselves as totally incapable of giving up cigarettes and have left the sanatorium on that account. In a follow-up of these patients, most of them turned out badly. Whether these bad results were due to continued smoking or to general lack of intelligence and self-control, it is, of course, impossible to say.

G. T. P.

Tuberculophobia ONE OF THE backwashes of the intensive anti-tuberculosis campaigns waged in this country during the past thirty-five years, has been the development among many of our countrymen and women of an undue fear of the disease Tuberculosis. At times this unreasoning fear becomes actually grotesque. I have known people to say that they would not spend the *night* in a resort for the tuberculous for fear of tuberculosis! They were not afraid to spend the *day* there; presumably the "miasma" of the night air would prove noxious. But why be afraid of the night air? As Woods Hutchinson wrote many years ago: "It's the only air we have at night."

In all seriousness, this question of tuberculophobia is a very living, practical thing. Like all ungrounded fears, it is based on prejudice and ignorance; upon a state of mind rather than a state of facts.

Tuberculosis is *not* a contagious disease in the sense that measles and scarlet fever are contagious diseases. It *is* a communicable disease and its incidence of communicability is in direct proportion to lack of hygienic living. Those of us who have practiced medicine for some time can well remember the sinister diagrams of "lung block" under the Manhattan terminus of the Brooklyn Bridge—frightfull tenements, where from certain noisome rooms and "apartments" there originated in rapid succession case after case of tuberculosis. We can still see those rooms marked in black squares on diagrams truthfully drawn and shudder as we gaze.

Are these, however, typical of the communicability of tuberculosis the country over? Thank God, No! As a matter of fact, save in the case of the "submerged tenth" of our society, tuberculosis is not an easy disease to acquire from person to person. Children living in a family where there is present an open case will, it is true, often develop tuberculous infection as disclosed by a positive tuberculin test; but tuberculous *infection* is

vastly, different from tuberculous *disease,* and the very development of a tuberculous infection as a result of repeated minimal doses of tubercle bacilli seems to build up an immunity in the sensitized organisms; in the vast majority of cases tuberculous disease does not follow.

Instances of "conjugal" tuberculosis; namely, the development of the disease in the second member of a couple, one of whom is definitely ill with the disease, is of surprising rarity in all but the lowest classes of society. Were tuberculosis contagious, or even as communicable as some would have us believe, it would seem that hardly any could escape. As a matter of fact, a few simple precautions in the family harboring an open case, will definitely limit the possibility of the spread of infection to other members of that family. These are:

1. Use of tissue paper to cover the mouth when coughing.
2. Use of sputum cup for sputum.
3. Use of separate dishes, glasses and flat silver.
4. Use of paper napkins.
5. Separate washing of bed linens and towels.
6. Keeping small children away from patient himself (it is perfectly safe for them to come into the room).

All these, save possibly the last, are easily brought about.

Furthermore, it is a well-known fact that employees working in sanatoria for the tuberculous contract the disease with the greatest rarity. When it is considered that these people are usually from the lower walks of life and that they are brought into contact with those utensils and belongings that are most intimately connected with the patient, the relatively slow communicability of tuberculosis must be evident. This is particularly striking in the South, where the vast majority of the employees in sanatoria for the tuberculous are colored, members of a race whose susceptibility to tuberculosis is known to be particularly marked and in addition, more ignorant and more lacking in proper hygienic training than their white brethren.

There is no reason for the panicky fear of tuberculosis. Almost anyone will unquestioningly and fearlessly spend the night in any metropolitan hotel without a thought as to who or what the previous occupant may have been. Practically everybody will go to bed on a Pullman, having no care as to who may have occupied that berth or compartment or drawing room on the car's previous run; and yet it may have been a tuberculous case expectorating billions of bacilli and, because of a common carrier, deliberately careless and carefree. "What you don't know don't hurt you."

I am fully cognizant of the sources of infection in tuberculosis and of their mode of spread. I am fully aware that the disease can be carried from one person to another by prolonged, intimate, unhygienic contact; but I am also convinced that in the vast majority of instances, among all but the lowest castes of society, this phobia concerning tuberculosis is all wrong and should be combated energetically. What we physicians seek to present is the truth. We do not want to soft-soap society, neither do we want to stampede humanity into the belief that a curse is among us that will spread its death-dealing arms broadcast irrespective of anything we can do. We do not want to countenance the idea that a resort for tuberculosis is a plague-spot, one to be avoided by the healthy at all costs. We wish to inculcate a solemn respect for the tubercle bacillus and for its possible ravages; we wish, at the same time, to insist upon the fact that granted its known presence, simple precautions will take care of every germ coming from the human body, and that the careful and conscientious and well-instructed patient will himself eliminate his harmful potentialities, leaving the almost ubiquitous tubercle bacillus uncontrolled and uncared for, together with the enormously Protean causes of lowered resistance in men, women and children, as the main agencies in the continued existence of this disease.

P. H. R.

The Consideration of Patients For Thoracoplasty*

BY
FRANK STEPHEN DOLLEY, M.D.
Los Angeles, California

TEN YEARS of thoracoplasty have passed. For the benefit of the future of this procedure it is high time that you, as medical men caring for patients both before and after thoracoplasty, and we, as thoracic surgeons, consider very critically and impartially the end results that we have obtained so that, by this consideration, we can, not only more correctly tell a patient contemplating it what he may reasonably expect following operation, but also in those cases not rendered well, find, perhaps, additional factors that may more nearly solve the problem of health restitution.

Ten years ago, doctors were hesitant to consider, more hesitant to advise, and very hesitant to try thoracoplasty. It was an experiment to the phthisiologist, a new field to the surgeon, a last desperate chance to the patient.

The physician said to his surgeon, "I have a patient who has been ill with pulmonary tuberculosis for years. He is surely going to die unless something is done. I have tried all minor therapies; thoracoplasty is his only chance."

The tuberculous history of the patient, his resistance to disease, the actual character of the pulmonary lesions were not particularly considered. It is not remarkable that the early results were discouraging enough. An appalling percentage died. Of those who survived, few were actually benefited materially.

1. Short sections of ribs only were removed.

2. Far more was done at each operation than the patient could safely stand.

3. Little was known of the proper post operative care.

4. Soft advancing bilateral involvement with little or no evidence of fibrous tissue reaction to the infection was present more often than not.

So then, in these early thoracoplastic days it was entirely logical and correct that prospective victims should react violently against this procedure. Scores of tuberculous patients left the various sanatoria in panic when it was mentioned to them. "The rib operation" was a thing of horror in those days.

The years have passed. In a properly conducted sanatorium where cases are properly selected and the various less radical measures which often are successful are given proper consideration the death rate is so low and the improvement in the patients is so high that the others, long sick, convinced of the seriousness of their pulmonary situations, accept the thoracoplastic decision with relief. The ones at present who usually agree to thoracoplasty:

1. Have been sick and incapacitated for years.

2. Are desperately anxious to find some short cut back to their families or business.

3. Suddenly realize with apprehension that the months and years of rest find them more seriously ill than when their so-called cure began.

When these chronic tuberculous patients look ahead along the road that they must follow, the converging lines exclude all else but thoracoplasty. Try as they may this last procedure cannot be excluded. Their impatience, their long continued limited activity, their worry over home and financial conditions, and their panic and fear of continued advance in their disease make the decision for them.

Let us, for a moment, leave the chronic tuberculous who have given their consent. In the last few months a few of us have had the temerity to forecast the treat-

*Read at the meeting of Federation of American Sanatoria, Kansas City, Missouri, May 12, 1936.

ment of acute pulmonary tuberculosis about as follows:

1. The general early recognition of pulmonary involvement.

2. Immediate isolation and bed rest.

3. Consideration and decision within the first few weeks as to whether or not sufficient improvement is taking place in the patients to warant assuming that continued rest alone will be sufficient to produce a cure. If not, then immediate consideration of therapeutic pneumothorax, temporary paralysis of the diaphragm, upper intercostal nerve crushing as potential aids to achieve or hasten healing.

4. If successful pneumothorax is prevented by adhesions to the chest wall, the adhesions are divided if it is practical and reasonably safe. If pneumonolysis is not feasible and if the pneumothorax is not definitely leading to arrest of the pulmonary lesions, it is to be at once discontinued since an unsuccessful pneumothorax has the minimal possibility of relief and the maximal one for disastrous complications.

5. If, then, pneumothorax has been found impossible or unsuccessful, then paralysis of the diaphragm can be attempted. Often this should be tried before pneumothorax. Division of the intercostal nerves from the second to the sixth or eighth by paralyzing the intercostal muscles may so reduce the mobility of that side of the chest that steady continued improvement is evident.

Now, in the consideration of all these things and the application of those that seem likely to benefit the patient, only a few months need pass before it becomes evident that progress toward recovery has ceased. Then, a collapse of the involved tuberculous tissue by multiple rib resection should be considered. In other words, the time seems not far distant when a patient coming under the care of a man experienced in treating pulmonary tuberculosis will be constantly watched with the idea that if improvement is not continuous something must be done at once to make it so. Each procedure in the order of its conservatism is given its chance. Following each, if good is to come from its application, evidence of this improvement should appear in a few weeks. So that, in the end, by the time a patient has been a year more or less under a doctor's care it is perfectly possible that such a patient could be promptly cured by the type of thoracoplasty peculiarly fitted for him. Pulmonary tuberculosis might well then be changed from a chronic disease to a comparatively acute one.

The author has been one of the earliest and one of the most enthusiastic advocates of this course and still is. Yet, there are two very definite reasons at present why this program cannot be carried through to comparatively early thoracoplastic success.

1. The patient himself usually is not convinced after a year or even two years that he will not recover without thoracoplasty.

2. By no means all our cures following thoracoplasty are really cures, and the consideration of this last sentence is the purpose of this paper.

It is the author's opinion that actually there is a small percentage of people following an extensive seven or more rib thoracoplasty who become physically active and well again. Why?

1. In the great majority of cases there is persistent bronchiectasis with more or less constant absorption from the infected bronchi; the amount of this absorption depending upon the amount of physical exercise of the patient who harbors the bronchiectasis.

2. There are probably always tubercle bacilli quiet but still active enough to produce toxins which are absorbed according to the blood supply of the incarcerating scar tissue.

3. There is too often pain and discomfort in the back and side when the patient is up and about.

Combinations of these three factors in turn produce physical fatigue, shortness of breath on exertion, and mental depres-

sion. Of them all, pain is often the most distressing.

The operation has been a success. The sputum is negative and the patient is no longer socially ostracized. He can do a certain amount of work, but his health has not been completely returned to him. Three things are preventing it. Pus, posture, and pain. The purulent secretion in distorted and chronically infected bronchi, the abnormal relationship of vertebrae and ribs, and the pressure upon intercostal nerves. So then, we should not, indeed cannot, unreservedly say to these recently ill people, "Permit us to collapse your chest by thoracoplasty and you will be well." These recently ill patients conceive of recovery as return to their previous good health. This, at the present time, we cannot promise them. On the contrary, those who have been ill for many years desperately assent.

Following the present day type of thoracoplasty with sufficient post operative rest, eighty per cent or more have consistently negative sputum. They are stronger, can do more before fatigue develops, and are no longer dangerous social contacts. They are improved and they are glad that thoracoplasty was done. Yet, pain and shortness of breath and fatigue persist. Those who have gone through years of mental and physical distress find their present thoracoplastic discomfort bearable in contrast to their limitations before thoracoplasty, however.

So, in considering thoracoplasty for a patient, there are two things at present that we must do.

1. Explain painstakingly to him what he may reasonably expect as his post operative result.

2. Resort to every possible measure in the attempt to minimize his post operative bronchiectasis and pain and bony deformity.

The prognosis a surgeon gives his patient should be made upon the results he himself is obtaining by thoracoplasty and not upon the statistics as given by others.

Pus, posture and pain. It is the author's firm conviction that the increasing percentage of relatively well people following thoracoplasty is in direct proportion to the success in minimizing these post operative conditions. The earlier the suppurative lung is collapsed the smaller will be the percentage of cases with permanently distorted and inflamed bronchi; the nearer the patient will return to complete restoration of health. For it is the fatigue from pus and pain that limits mental and physical activity.

The present day thoracoplasty is very briefly as follows. If the involvement is essentially in the upper lobe, there is complete removal of the first and second ribs, often with their cartilages, the complete or nearly complete removal of the third and very long sections of those ribs below, together with their transverse processes, so that actual obliteration of the cavity or cavities is accomplished, as shown by X-Ray taken with sufficient penetration to burn through the overlying thickened pleura and soft tissue edema. The number and length of ribs and the time between stages depend upon the condition of the patient and the degree of motion of the released lung and pleura at the time the rib supports are removed. The application of chemical or heat to the rib beds to delay rib regeneration sufficiently long so that the previously decided upon collapse of the chest wall can be accomplished. This type of thoracoplasty properly conducted both as to surgery and post operative care leads almost uniformly to obliteration of cavities and to negative sputum. But the very extensiveness of the procedure that is successful in the above, increases the probability of bony deformity and pain and, therefore, of early fatigue and shortness of breath, of marked limitation when he returns to take up the position in business and society that he formerly occupied.

We are now removing close to the transverse process portions of all the intercostal nerves from the fourth to the eighth, inclusive, and if we resect por-

(Continued to page 26)

Diagnosis of Pulmonary Tuberculosis By the Family Physician

BY
FRANK WALTON BURGE, M.D., F.A.C.P.
Philadelphia, Pa.

THE LUNG specialist receives two main classes of tuberculosis patients. First, the early case; the early case is usually referred to him by the type of practitioner who makes a careful physical examination of the naked chest and has routine sputum analysis done on all cases that have cough and expectoration. The second group, consisting of advanced cases of tuberculosis, he usually receives from non-professional sources. These cases come to him because some lay person suspects that they have tuberculosis. Frequently, they give a history of having gone to physicians over a period of years. In the vast majority of cases their stories indicate that they never were carefully examined physically, nor their sputums tested, nor their chests x-rayed. In most instances, it is not a lack of ability to make a diagnosis on the part of the practitioner when he fails to make an early diagnosis, but it is due to his neglecting to examine the nude chest, to have an examination of the sputum made, and with the failure of these two agencies to reveal the cause of the patient's symptoms, to have the chest x-rayed.

Not only is this failure to make the necessary examination a matter of life and death to the tuberculous patient, but it is frequently a source of loss of reputation to the physician. The tuberculous patient acquires a considerable amount of information concerning his disease when he goes to sanatoria and sees there cases very much earlier than his, with very much better prospects of recovery and shorter stay in the sanatorium. His first question always is, "Why didn't my doctor examine me and find out what was the matter with me long ago? I had the same fatigue, loss of weight, cough, and expectoration as these other patients and I recall feeling feverish in the afternoons. Why was I denied a physical examination, a sputum examination, a temperature reading, and if necessary an x-ray, to show the real cause of my trouble?" This question cannot be answered by the specialist. It is unanswerable.

We know by the ratio of tuberculous patients to deaths from tuberculosis that there are a vast number of undiagnosed cases in this country. The family physician has the best opportunity of diagnosing these cases because the patient comes to him at the time of minor colds, and routine sputum examinations alone will disclose a great many of these cases; the sputum being especially likely positive during acute respiratory infection.

It would not seem to be necessary to mention the fact that tuberculosis cannot be diagnosed by physical examination when clothing is rubbing against the stethoscope. Every lung specialist, however, sees many patients who have never had a chest examination in spite of long months of doctoring.

The doctor that the tuberculous patient never forgives and never ceases to "knock," is the doctor who did not examine the patient's nude chest and have a sputum examination, and a chest x-ray if indicated. It is almost always neglect of these fundamentals and not inability that causes the physician to lose his reputation in his community.

Summary.

The Three Fundamentals of Chest Diagnosis:

1. Physical examination of the naked chest.
2. Sputum examination for tubercle bacilli.
3. X-ray.

The Management of Pulmonary Tuberculosis

BY
GEORGE H. VERNON, M.D.
Springfield, Illinois

THE IMPORTANCE of rest in the treatment of pulmonary tuberculosis cannot be exaggerated. Notwithstanding the rapid strides made in surgical treatment in recent years, complete bed rest is still of fundamental importance. So much so, that it seems quite worth while to outline in detail a practical method for its application. One cannot avail himself of all the benefits of surgical treatment until it is combined with such adequate generalized rest as will be described.

The treatment of every active case of pulmonary tuberculosis should be begun by placing the patient at complete bed rest. This is true of every active case regardless of the extent of the lesion. Failure to recognize the necessity for drastic measures in the incipient or minimal case may allow progress to an advanced stage in a surprisingly short space of time. The institution of adequate rest requires that the patient be placed flat in bed. One or two pillows are permitted under the head but the shoulders should not be elevated by back rest or pillows. Most of the time is to be spent on the back with just enough turning on the sides to rest tired muscles and to assist in the production of sputum. The arms are kept close to the sides. Reaching is discouraged, as is the placing of the arms above or under the head. If extremely ill, the patient is fed by a nurse. When somewhat improved he learns to eat lying on one side from a tray. Bedpan and bed-bath are insisted upon.

Assuming that the patient has been placed in bed as described, the ordering of the days activities must be given careful consideration. The hours from 10 until 12 a. m. and from 2 until 4 p. m. are set aside for undisturbed rest. To be adequate, the nursing staff must be able to complete all routine nursing care outside these hours. Even the physician is required to respect this partition of time. Daily medical rounds are started early and concluded by ten o'clock. Only occasionally do monthly physical examination of the chest, x-ray and laboratory studies, or other special work intrude on the time of the individual patient.

These intervals from 10 until 12 a. m. and from 2 until 4 p. m. are called rest hours. The doors of the rooms are closed and the windows opened. The patient is to sleep if so disposed but otherwise, he is to refrain from talking, reading or listening to the radio. All lights are out by 9 p. m. and the same rules apply until morning temperatures are taken.

These measures bring the diseased lung tissues as nearly as possible to complete rest. They are continued until some time after the patient is temperature free. Something should be said about the method of determining temperatures. Thermometers are left in place beneath the tongue with the lips closed for a minimum of ten minutes. The hour following meals is avoided and patients are cautioned not to take hot or cold drinks before temperature time. Temperatures are taken at 7 a. m., 2 p. m., 4 p. m. and 7 p. m. When it is evident that the 7 p. m. temperature is always lower than the afternoon readings, in patients showing only moderate elevation of temperature, the evening reading is discontinued.

These precautions are necessary because of the great significance of slight elevations of temperature in pulmonary tuberculosis. Furthermore, an accurate temperature record is the most valuable single aid in directing the activities of the patient as recovery progresses. Only after the patient has been temperature

*Presented before the Springfield Medical Club, December 17, 1935.

free for several weeks are any increases in physical latitude considered. These increases are referred to as privileges. They mean a great deal to the patient as tangible evidence of improvement.

Privileges are granted at regular weekly staff meetings. Here each case is reviewed and any special problems discussed. No patient's activities are increased at more frequent intervals than two weeks. In fact it is frequently necessary to wait three or four weeks before the next step can be taken. The patient is kept at complete rest until he is temperature free and has remained so for several weeks. Then if his condition is satisfactory in other respects he is permitted to sit up in bed for one meal daily. He is propped up with back rest or pillows and eats from a tray on a small bed table. Two weeks later, all signs being favorable, this is increased to two meals daily, so that at the end of six weeks the patient is sitting up in bed for all meals.

After another interval of two weeks or more, the patient's condition remaining in every way satisfactory, he is allowed to use a bedside commode once daily. This is increased again at intervals of at least two weeks to two, three, and full or unlimited commode privilege. This stage in recovery is therefore of two months duration or longer.

If this program seems overconservative, there are at least two very good arguments to be offered in its defense. Results have been progressively better as the regime of rest has been made more strict. Twenty years ago the sickest patients got out of bed on wind swept porches and walked inside to the bathroom. We are certain that it is more than an impression that there are fewer severe hemorrhages, fewer rapidly progressive cases, and more favorable results under the present plan. In the second place, only very rarely is any individual patient able to progress from bed rest to normal activity without several back sets. These necessitate going back over at least part of the ground already covered.

The most common cause for the withdrawal of privileges is recurrence of fever. One temperature reading of 99.4 returns the patient flat to bed for that day and until the situation is reviewed by the physician making rounds the following morning. He may at his discretion reinstate part or all of the patients exercise. A temperature of 99.4 on two successive days returns the patient to complete rest until the next regular staff meeting. Blood streaked sputum or frank pulmonary hemorrhage are obvious indications for absolute rest. Digestive disturbance with uncomfortable distention or diarrhea is common. Whether accompanied by elevation of temperature or not it is considered sufficient cause for at least temporary return to complete rest. So also is nerveousness if present to an extreme degree.

When, however, the patient with full commode privilege is apparently ready for further activity he is permitted to go to the bathroom once daily. This involves a short walk and being on his feet for from five to fifteen minutes. Following this, the second, the third, and full or unlimited bathroom privilege are added in the same deliberate way. Finally tub-bath is permitted. Time should be limited to five minutes in the tub and the water should not be too hot. The extremely fortunate patient might reach this stage on the road to recovery in six months after going to bed.

At this point something should be said about the regularity with which exercise is taken. The patient is required to utilize the authorized privileges each day unless there is elevation of temperature or pulmonary hemorrhage as mentioned. Temporary restriction of activity is subject to medical regulation in the same way as increased activity. This is sometimes necessary to combat the tendency of some patients to drift into a state of chronic invalidism which their condition does not warrant. Then too, there is an element of trial and error in the determination of an individuals exercise tolerance. Increases are made on the supposition that the patient is doing well on the ordered regime.

The next step in the progress of the patient who is doing satisfactorily on full bathroom privilege, consists of sitting up in a chair. This is permitted in the following amounts, separated by the usual interval of two or more weeks: one half hour, two half hours, two hours, four hours, and full time up, exclusive of rest hours.

The patient is then gradually allowed to go to the dining room for meals over a period of from two to three months. First for one meal weekly, then three meals weekly, one daily, two daily and finally for all meals. Walking on level ground is the next addition. Starting with five or ten minutes this is built up slowly by five or ten minute increases.

The list of privileges which have been outlined fall naturally into six groups. These are bed meals, commode, bathroom, sitting up in chair, meals in dining room and walking on level ground. It is felt that the transition from one group to another entails a greater change than from one stage to another within the group. For this reason it is a frequent practice to allow a longer time between groups than between individual stages.

While rest is by long odds the most important factor in recovery from tuberculosis, there are many other features of treatment which are essential for satisfactory results. One of these is the absolute interdiction of smoking. We know of no scientific evidence of either harmful or beneficial effects of smoking on diseased pulmonary tissues. There may be some irritative action as evidenced by the fact that fine rales present in healthy smokers frequently clear up after a weeks abstinence. At any rate it is our practice to advise against smoking for all time in tuberculous patients and to insist upon this restriction in the sanatorium.

Outside food brought in or sent in by well meaning friends or relatives is undesirable. The patient's appetite frequently is not good. A wholesome general diet is provided. Nourishment of any kind between meals is withheld if it interferes with the appetite at meal-time. Rich foods and pastries eaten at odd times can completely defeat the cultivation of wholesome dietary habits. Between meal nourishments consisting of various milk drinks are provided where they seem to make a desirable addition to the patient's total food intake. If outside food is utilized at all, it is best in the form of fresh fruits or candies in small amounts which are eaten immediately following the regular meals.

Probably as difficult to control as anything are the visits of friends and relatives. At home this is almost impossible. In the sanatorium visiting is restricted to the hours between two and five on Wednesday and Sunday afternoons. If a number of visitors are to be seen, not more than two should be in the room at the same time. In general the patients who come from a distance and have relatively few visitors at intervals of several weeks are more settled and progress more satisfactorily. One of the definite benefits of sanatorium care is the physical separation from all the responsibilities of home, business and social connections. Visits of friends and relatives almost invariably bring back these problems vividly. It is almost unbelievable how little judgment is exercised by visitors in shielding the patient from outside worries in many instances. That visitors are upsetting is shown conclusively by the fact that many patients show higher elevations of temperature on visiting days than at any other time.

Most of the discussion up to this point has treated of matters applicable to every case under treatment. This might leave the impression that there is little room for individualization in working with such patients. Nothing could be further from the facts. In no phase of practice is it more necessary to take cognizance of individual physical, intellectual and psychological capabilities.

The experience of having active pulmonary tuberculosis is a serious and time consuming one. It invariably interferes materially with the plans of the patient. The physician has not fulfilled his most

important office unless the months of convalescence are made a period of education and readjustment. It takes a great deal of strength of character to do the things that one must do to recover and remain well. The physician must be able to inspire confidence and respect if he is to be of any assistance in this aspect of the treatment.

No promises are made as to time. The patient is gradually introduced to the idea that it is impossible to know definitely how long it will take or how complete his ultimate recovery will be. This should not be done too early or too abruptly. It may be suggested gradually and indirectly and the intelligent patient learns it from observation and experience.

Tuberculosis takes away so much that the need for the substitution of new interests is obvious. In the very sick patients this is relatively unimportant and the concern of patient and physician alike are focused on the problem of getting well at all. However, as the patient begins to be more comfortable physically, an increasing amount of time must be given to this problem. At first the simpler forms of physical therapy are utilized under the guidance of a person interested in or especially trained in this type of work. Where the patient's window commands a view of sky, trees and shrubs it is sometimes pleasant to watch for and become acquainted with the bird population. This can be expanded by the use of a field glass and an illustarted book with descriptions of bird habits. Women have frequently a previously acquired interest and skill in needlework. Something of this type can usually be found which will not be harmful. An occasional patient finds stamp collecting an absorbing pastime. Basket weaving and leather work are suited to the later stages of convalescence. Cross-word puzzles are valuable. They stimulate interest in the spelling and meaning of words. An enlarged vocabulary is built up and sometimes subjects for reading and investigation are suggested. Some discrimination in the selection of radio programs will enable the patient to indulge or cultivate an appreciation of music. There are a number of other worthwhile interests which may be followed and guided to a greater or lesser degree in this way. If excitment or competetive feeling are aroused as in accounts of prize fights or baseball games definite harm may result. The responsibility for any undesirable effects of such activities rests on the physician and for this reason he should undertake their supervision.

The reading of worthwhile books offers the greatest possibilities for lasting returns to the patient. Where an appreciation of the pleasures of reading has not been acquired earlier every effort is made to introduce the patient to them. This is done by frequent conversational reference to the characters and situations of great books. Reference to ones own reading at the time may stimulate a similar interest in the patient. Some part of the weekly lectures is given over to a discussion of books. Other means of building up patient morale and development of adequate philosophy will be as varied as the cultural background and interest of the physician. Success will depend in a measure on the desire and mental capacity of the patient to accept and follow.

No discussion of the institutional care of the tuberculous would be complete without some consideration of the length of time the patient should remain in the sanatorium. This is very much a matter for individualization and depends on the home conditions, the financial background, and the psychological makeup of the patient. If progress toward quiescence is fairly regular and there is promise of relatively complete recovery, one would like to see the patient on two hours walking exercise before discharge. Some patients will never be able to advance this far. Where this is true and one seems to have reached the maximum of exercise which the patient can tolerate after repeated trials, two to three years will probably give all the aid possible in recovery. For adequate reason such as

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Home Infection In Tuberculosis and How To Neutralize Its Dangers

BY

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Cardiff, Wales

AS THE RESULT of an enquiry carried out by my colleagues on the medical staff of the Welsh National Memorial Association, it was possible for me to publish certain figures bearing on previous exposure to infection as a factor in the history of children found suffering from tuberculosis. The results, together with some figures relating to adult patients between fifteen and twenty-five years of age, are here reproduced as a basis for the remarks which I wish to make upon the importance of home infection in the production of the disease.

The figures as they stand in the table are striking, and appear to me to justify the view that exposure to contact with infected persons in the home during childhood is a very serious danger against which our best efforts should be directed. It is realized, however, that this opinion may be questioned on the ground that a group of non-tuberculous children, if their histories were carefully investigated, might afford an equally high proportion of individuals with a record of exposure to infection during early life. I am not in a position to give statistics derived from Wales upon this latter point, but very interesting figures bearing on the question have recently been published by Dr. Godias J. Drolet, [1] who shows that in his records at the Bellevue Hospital, New York, a history of exposure to tuberculous infection was as frequent amongst non-tuberculous patients as amongst those suffering from the disease. These figures, however, even if applicable to this country, which is open to doubt in view of the very different economic conditions prevailing in New York City, do not settle the question, as the mere absence of developed disease does not exclude infection. It may be, for instance, that many of the children classified as non-tuberculous are nevertheless destined to develop the disease in later life.

It appears to me that the Welsh figures given in the accompanying table must be regarded as very significant. Out of 256 patients under fifteen years of age in Cardiganshire, no less than 72 per cent give a history of previous contact with infection, chiefly in the home; and out of a total of 569 children with pulmonary

Pulmonary Cases	Total Number investigated	Total with History of Previous Contact	Percentage with History of Previous Contact
Cases under fifteen years (Dr. Watson)	100	65	65
Cases under fifteen years (Cardiganshire; Dr. Charles Lloyd)	256	185	72
Cases under fifteen years (reported by other observers)	213	134	62
Cases fifteen to twenty-five years (females)	344	174	50
Cases fifteen to twenty-five years (males)	268	75	40
Non-Pulmonary Cases			
Surgical tuberculosis (children)	166	53	32
Non-pulmonary cases in children (Cardiganshire; Dr. Charles Lloyd)	202	99	49

(In over 90 per cent of these cases the contact was in the home.)

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disease, 384, or 67 per cent., give a similar history. It is hardly within the bounds of possibility that such percentages are to be found amongst non-tuberculous children of similar age groups; and the figures would appear to demonstrate that the infected home is an extremely dangerous factor in the production of the tuberculosis of childhood, adolescence, and later life. If this conclusion be accepted, it is to the home that hygienic measures should especially be directed.

Many lines of effort, more or less direct, suggest themselves. One is tempted, for instance, to advocate the removal of infected persons from their homes; but all those with experience know that such a course is often impossible in individual cases. Again, it may be suggested that children of tuberculous parents should be removed out of reach of contamination by the work of some such organization as the Grancher system; but here, again, practical difficulties usually step in to neutralize what has been found, where applicable, to be an extremely valuable line of prevention. Open-air schools and convalescent camps or hospitals would doubtless be of enormous assistance, but no one can claim that these institutions exist in numbers sufficient to cope with the demand which would arise were such a measure generally applied in this country. In nearly every direction the good advice which we might wish to give appears to be very largely neutralized by practical difficulties of a serious kind. It is necessary, then, to consider what may be done to make the best of a bad situation.

We are up against difficulties of a formidable kind—housing difficulties, financial difficulties, difficulties incident to the natural love and affection of parents for their children, and the difficulties inseparable from ignorance, prejudice, and want. In spite of all these difficulties, much is being accomplished. Apart from the splendid achievements of tuberculosis physicians and other doctors, everyone acquainted with their work must acknowledge the value of the exertions of the health visitors in the larger communities where these trained persons are available; and, again, the assistance rendered by after-care committees is of incalculable value. There is one line of effort, however, which, though not forgotten by hygienists, is still, I think, capable of considerable extension, and that is the intensive education of the tuberculous persons themselves as to the risk they constitute to their dependents and as to the measures which they should adopt to diminish it.

That it is possible for children to live in contact with infected parents and yet remain in good health is demonstrated not only by the researches of Dr. Godias J. Drolet, already referred to, but in a highly interesting manner by the experience of such an organization as the Cambridgeshire Tuberculosis Colony at Papworth, [2] where, according to Dr. Varrier-Jones, not a single case of tuberculosis has yet arisen amongst the children of the colonists living in the village attached to the institution. Here we have an example of what can be done by enlightened supervision and advice. The houses are, of course, superior in many respects to those often occupied by the poorer classes in this country; but, at the same time, they are by no means large, nor are the occupants either wealthier or better equipped than the members of comparative social groups living under ordinary industrial conditions. If it were not for the enlightened supervision of those in charge, the risks to children in a village settlement for the tuberculous would be greater than those that arise in ordinary village life. What we have to fight against is the intensive infection brought about by the thoughtless and uncontrolled contact of tuberculous parents and their children, augmented, perhaps, by poverty and want, which obliges the patients and the children to occupy the same sleeping apartment or even the same bed, aggravated as a rule by carelessness in the disposal of sputum and in the com-

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Ambulatory Pneumothorax in Pulmonary Tuberculosis

BY

WILLIAM DAVIS TEWKSBURY, M.D., F.A.C.P.*

Washington, D. C.

IN RECENT years the use of collapse therapy in pulmonary tuberculosis has increased tremendously. The three chief methods of producing collapse are artificial pneumothorax, phrenic nerve operation, and thoracoplasty, and with this general increase in the use of these operations there have naturally ocurred changes in our ideas and modification of our methods of treating our tuberculous patients.

While I was in charge of the Catawba Sanatorium, Virginia, 1909 to 1911, a few reports on the use of pneumothorax in pulmonary tuberculosis appeared in the literature, but we considered it too radical a procedure to use in a State Sanatorium. In 1913 when I started using pneumothorax at the Tuberculosis Hospital, D. C., it was resorted to only in advanced cases which had been given bed rest treatment for a long period of time without improvement and the fact that we obtained a fair percentage of improvements and a few cures is a high tribute to this method of collapse therapy. We advised in those days that patients taking gas must still continue rest treatment in the sanatorium for a year or more.

At the present day many are advocating the immediate use of pneumothorax on every suitable case of pulmonary tuberculosis in which there is activity and a positive sputum. The ideal case is, of course, one in which the disease is unilateral, but we have found that many bilateral cases can be treated successfully.

In 1924, Davies I, said that no case of pulmonary tuberculosis which has been diagnosed with certainty is too early a one for treatment by artificial pneumothorax.

In 1932, Hawes and Stone II, advocated the more frequent and earlier use of pneumothorax.

In 1933, Cedric Shaw III, after reporting the results in 267 cases advocated the use of pneumothorax in earlier cases.

In 1933, Lawrason Brown IV, predicted and advocated the earlier use of pneumothorax.

In 1934, V, I stated that it was my opinion that the artificial pneumothorax should be used immediately in all cases of early unilateral tuberculosis.

In 1935, Myers and Levine VI, strongly urged the use of pneumothorax in progressive minimal cases.

In 1935, Cole and Harper VII, recommended its immediate use in early cases.

These are only a few of the many who in recent years are urging earlier use of this method and are starting many of their cases earlier. This has resulted in a marked increase in our ambulatory pneumothorax patients, most of whom have had their treatment started in a sanatorium, have promptly become symptom free, maintained a negativo sputum, and in a comparatively few months have returned to their homes and their daily work. There has been some fear expressed that the rapid curing of cases with artificial pneumothorax would markedly reduce the number of patients in public and private sanatoria, but I believe, equipped to use the various forms of collapse therapy, the sanatorium has much more to offer the patient than in the past and will benefit accordingly. The sanatorium will have a larger number of patients with a shorter length of treatment and the important factor from the health standpoint is that these ambulatory pneumothorax cases are almost invariably free of tubercle bacilli and hence are no menace to the public.

The marked increase in this type of patient is exemplified by my experience

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in Washington. Ten years ago I averaged from ten to fifteen patients taking artificial pneumothorax, whereas at present I have approximately fifty patients taking this treatment and of this number all but seven are doing a normal day's work. This is also the experience of men doing chest work in the other large cities.

To emphasize the marked reduction in length of treatment when ambulatory pneumothorax is instituted, I will report briefly a few cases.

Case No. I, Mr. C. McC., engineer, diagnosed pulmonary tuberculosis in June 1933 and entered sanatorium in July 1933. Examination showed tuberculous infiltration of upper lobe of left lung with cavity about 3c.c. in diameter. Patient had daily fever and an artificial pneumothorax was started in July, 1933. When the patient returned to Washington in October, 1933, about three months after beginning treatment, he was symptom free and had a negative sputum. He returned to work in December, 1933, and has continued working to date without any symptoms and no loss of time from work because of sickness. His pneumothorax is still being maintained.

Case number II, Mr. D. M. D., manufacturing representative, was diagnosed tuberculous in January, 1934. Examination showed dense tuberculous infiltration in upper lobe of right lung with cavity 4c.c. in diameter. He had daily fever and positive sputum. I advised him to go to a sanatorium but he stated that he would lose his entire business if he had to be away over two months. I started pneumothorax treatment on February 1, 1934. He became symptom free in a few weeks and returned to work about March 28, 1934, less than two months after treatment was started. He has had no symptoms, his sputum is negative and he has not lost any time from his work due to sickness. His x-ray films show that his cavity has completely closed. He is still continuing pneumothorax.

Case number III, Miss E. M. B., bookkeeper, was diagnosed tuberculous June 3, 1932. Examination showed dense tuberculous infiltration in upper lobe of right lung. No cavity could be seen in x-ray, but patient had several severe hemorrhages. I started pneumothorax treatment at home June 5, 1932, because she refused sanatorium treatment. She returned to work in two months and has been perfectly well with negative sputum to date. Pneumothorax treatment was discontinued in February, 1934.

Case number IV, Miss M. W., stenographer, was diagnosed tuberculous October 29, 1932. Entered sanatorium January 1, 1933. Examination showed scattered soft infiltration throughout upper lobe of right lung and patient had several profuse pulmonary hemorrhages. Pneumothorax was started in February, 1933; she returned to her home the following October and has been working since with absolutely no symptoms and sputum negative.

We have had many other cases similar to these and I have felt that we were rather radical in allowing a number of these patients to return to work in two months, but recently Cole and Harper VIII, reported several cases returning to work in considerably less time than two months with no unfavorable results.

I wish to report briefly on ambulatory patients coming to the office for pneumothorax during the past six years. We have had a total of one hundred and four cases and the results have been as follows: seventy-four apparently cured and arrested, thirteen unimproved and eleven dead. All of the seventy-four cases classed as apparently cured and arrested, are working or carrying on their normal activities. Of the thirteen classed as improved, most of them show promise of becoming arrested cases when sufficient time has elapsed to so class them. Of the total number of one hundred and four cases, seventy had their initial pneumothorax in sanatoria and thirty-four were given their initial treatment by me, either in a rest home or in their own home. I find it is usually possible after the third or fourth treatment to get them into the

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Nutrition and Tuberculosis

BY
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Denver, Colorado

NUTRITION and tuberculosis are intimately interrelated. Nutrition plays an important role in the etiology, complications and therapy of tuberculosis.

The word nutrition in its broad sense implies the character of the ingested food, the digestive processes that convert these foodstuffs into energy or building stones suitable for the particular needs of the body, the processes of assimilation, the degree of development of the body, and the elimination of waste materials.

In the first place, many writers believe that a faulty diet which results in a faulty state of nutrition is partly responsible for the development of tuberculosis. To be sure, tuberculosis is caused by the tubercle bacillus, but practically every one is infected with the tubercle bacillus, yet most people do not develop the disease. What is there about those who develop the active disease, that has rendered them susceptible to the inroads of the disease? It is evident that it is not the virulence of the infection, but rather the lowered resistance that marks the beginning of the disease in adult life. Tuberculosis has been compared to a noxious weed lying latent in practically all human soils, finding its opportunity for growth in some bit of bad husbandry, some over-strain, some over-fatigue, some dissipation, some neglect, or some lowered vitality through illness. The latent infection becomes a disease not by accident but by living and working under improper conditions or improper ways. Tuberculosis recruits many of its candidates from the undernourished, the underfed or stunted persons from the centers of congestion of urban communities. "The death rate from tuberculosis in England rises and falls with the price of bread," says Stewart.

Young people who are both underweight and undernourished are choice candidates for active tuberculosis. It has been shown by studies in vital statistics that the mortality from tuberculosis in the early twenties increases one percent for every pound that the individual is below the average weight for the height. Interestingly enough, although the general mortality from tuberculosis has steadily declined in the past decade, nevertheless it has increased in the age-group of adolescent and young women. The recent fad for reducing with its implied subsistence diets may be responsible for this paradoxical situation.

American diets as a whole are much better than they were a quarter of a century ago, due to the educational propaganda that has been carried on to make the public food conscious, particularly as to the vitamin and mineral content of the diet. It is true that much of this propaganda has been developed by commercial interests, but in this case, they have served a useful purpose.

However the American dietary has not yet reached a stage of perfection. Sherman has recently pointed out that many American diets are deficient in calcium. An analysis of 224 presumably typical American diets showed about seven percent, or one in fourteen, to be deficient in calcium. He states that it is by no means safe to assume that a freely chosen diet would always furnish calcium in sufficient amounts to afford a safe margin above the actual requirement of normal nutrition, that the minimum requirement for calcium equilibrium is 0.45 grams daily, while 0.75 grams is a safe intake allowing for a liberal margin of safety. For practical purposes, this amount of calcium is contained in one quart of milk. This calcium deficiency in the American diet can well be considered in the analysis of the causes of tuberculosis.

Another instance of a deficiency in many American diets is brought out by the studies of Hanke who analyzed the

eating habits of several hundred children, and found that the evidence indicated that many American diets are deficient in vitamin C, and he states that this deficiency may be a factor in the etiology of certain diseases.

Nutrition, of course, is but one of the factors that enters into the predisposing etiology of tuberculosis. There are numerous other influences. In this paper, we are considering the nutritional factor.

It has been sometimes argued that a normal person left to his own instincts will select the food suited to his needs; in other words, in health the appetite is a good guide to the quantity and quality of the food to be eaten. This may hold true in some cases, but it does not hold true in the multiplicity of cases where some pathologic condition exists in the body which disturbs the primitive instincts; hence in disease the appetite is no longer a reliable guide to the needs of the body; in fact it is often actually misleading. Thus in diabetes, people develop voracious appetites, yet they are advised to eat a limited amount of food; whereas in tuberculosis, the appetite may be lost, yet the patient is encouraged to eat more than he thinks he is able to handle properly. Furthermore, even in the case of the socalled normal individual, the force of economic pressure frequently determines his purchasing tendencies; and since the vitamin rich foods may occur in the more expensive groups of foodstuffs, these are apt to be overlooked where economic pressure is a determining factor.

In studying the nutritional needs of an individual, it is highly desirable to have a yardstick to measure and pre-determine his physiologic needs. When these physiologic needs of an individual are properly supplied by adequate food then such a diet may be designated as a normal diet.

There is no such thing as any general diet which is adequate for all persons of all ages, because the physiologic needs of even healthy persons change all through life, from birth to senescence; while in disease there are infinite special problems that arise. The very physiologic processes of the body alter their rate of metabolism from decade to decade, and this necessitates a constant readjustment of the diet. In addition, the factors of taste, habit, mode of food preparation, and custom add to the complexity of the problem.

But all diets have certain essentials, and experiences has taught that there are at least eight such essentials in every diet. These eight essentials of nutrition are: 1, energy; 2, protein; 3, carbohydrate; 4, fat; 5, water; 6, salts; 7, roughage; and 8, vitamins. Any diet which does not include all of these eight essentials of nutrition is a deficiency diet. With eight potential variables, it becomes evident that a deficiency diet may assume many forms. Thus a diet becomes deficient if it is made up largely of corn and dried beans. The vitamins are obviously absent. Another diet contains the vitamins but is deficient in calcium, iron or iodine. The current fad for reducing has given rise to an interesting example of a deficiency diet. This diet is made up largely of salads, fruits and meat. It contains an adequate amount of protein, vitamins, salts, roughage, but it is deficient in energy; thus compelling the body to destroy its own tissue to extract energy.

An adequate or normal diet for the average American adult weighing 150 pounds engaged in light work, which will protect the individual from all known deficiency diseases should contain about 2800 calories of energy, 75 grams of protein, 125 grams of fat, 325 grams of carbohydrate, a liberal supply of all the vitamins including vitamins A, B (B^1), C, D, E, G, (B^2); about four grams of table salt, three quarters of a gram of calcium, one gram of phosphorus, 15 milligrams of iron, a liberal supply of roughage, and eight to ten glasses of fluid a day.

The basic normal diet.

A sample 2800 Calorie Diet for the average American adult of 150 pounds that will adquately protect the general health.

Breakfast	Household Measure	Grams or CC
Orange	Average serving	200
Oatmeal	Average serving	125
Cream (20%)	2/5 cup	100
Sugar	1 tablespoon	20
Whole wheat toast	2 slices	60
Butter	2 squares	15
Coffee	1 cup	
Lunch		
Tomato soup	3/5 cup	150
Egg sandwich	Average serving	90
Peach salad	Average serving	200
Milk	1 glass	180
Wafers	6	20
Dinner		
Steak	Average serving	150
Potato (baked)	1 medium	200
Green beans	Average serving	100
Whole wheat bread	2 slices	60
Butter	2 squares	15
Fresh vegetable salad	Average serving	200
Sponge cake	1 slice	15
Cream (20%)	1 ounce	30
Sugar	1 teaspoon	7
Coffee	1 cup	

This diet contains 2818 calories, 76 grams protein, 124 grams fat, 330 grams carbohydrate, 0·8 grams calcium, 2 grams phosphorus, 30 milligrams iron, and all six vitamins. (From Gauss, Harry: *An Adequate Diet for Dental Health, Nutrition and Dental Health*, 1935, 1, 5.)

The above diet is to be considered a normal diet only for the average American adult of 150 pounds who is engaged in light work. The specifications for other normal diets vary greatly with the age, height-weight of the individual and his work. The principal variations occur in two of the essentials. First, in the amount of required energy, and second in the protein fraction of the diet, or the quantitative arrangement of the foodstuffs.

The energy value of the diet varies from 700 calories in the first year of life to 4500 calories for the adult engaged in heavy manual labor. With advancing years and a withdrawal from the more arduous tasks of life, the energy requirement usually diminishes.

Secondly, the protein requirement per kilo body weight is highest at birth and then diminishes until adult life is reached. This causes a marked alteration in the ratio of the foodstuffs in the diet from that of the infant to that of the adult. The protein requirement for the infant is 2.5 grams per kilo body weight, whereas in adult life it is 1 gram. In infancy the ratio of carbohydrates to proteins to fats is 5 CH to 3 P to 4 F; whereas that of the adult is 13 CH to 3 P to 5 F. Within the first year the ratio of the foodstuffs begins to change, and the change continues until the adult ratio is reached.

When a person contracts tuberculosis, and especially if he is underweight, as so many of them are, he is told to eat more than he has previously. As stated the appetite is no guide. Too often it is lost in tuberculosis, which is unfortunate, since the patient not only needs as much food as in health, but more. He needs more food for two reasons: First he has a fever which causes him to burn up his energy faster than in health; secondly, he has a destructive process going on in his body which he must seek to overcome by supplying ample repair material in the form of food. Against these reasons for additional food is the fact that the enforced idleness which is a part of the treatment reduces his energy expenditure. Nevertheless, the patient with tuberculosis at bed rest needs more food than the non-tuberculous person under similar conditions. Hence arises the indication for a relatively high caloric diet in tuberculosis. However, in the attempt to build up the patient with tuberculosis there must be a plan, and not just stuffing, which can be equally dangerous. The desired goal is to make the patient attain his normal weight for his height and age. It is not desirable for him to gain weight in excess of his ideal age-height-weight ratio.

On admission to a hospital, the patient is put to bed and told to reduce his activity to the minimum, or he may be put at absolute rest. This of course is necessary in the treatment of tuberculosis, but it is not without its disadvantages; because the enforced idleness removes part of the normal stimulus to intestinal peristalsis. In the natural order of physiologic events, the intestines depend upon the general muscular activity for their stimulus to proper function. Now they be-

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come deprived of this stimulus and tend to become sluggish, and the patient develops constipation. Accordingly to compensate for the removal of the stimulus arising in the general muscular activity, the diet is planned to contain additional roughage, as spinach, carrots, string beans, etc. These foodstuffs posses a triple virtue. They not only contain roughage, but they are rich in vitamins and in the mineral salts, providing they are properly prepared. Unfortunately, a large group of patients come to tuberculosis hospitals, who never acquired a taste for these foods, and since most patients are given a reasonable privilege in the selection of their food, many of them omit these necessary and health-restoring foods from their meals to their own detriment. Without doubt, a large number of the dyspepsias that are encountered in tuberculosis sanatoria result from the failure of the patients to eat a sufficiency of fruits and vegetables.

It is not within the scope of this paper to describe all of the special dietetic problems that occur as a result of the various complications of tuberculosis. However it is permissible to sound a word of caution with reference to certain highly advertised diets. There are no accredited trick diets in tuberculosis; neither are there necessarily any special virtues to diets labelled by imposing sounding titles Fads and mysterious diets should be examined carefully and checked by standard principles of nutrition. An example of a highly publicized diet is the Hermannsdorfer-Sauerbruch diet for tuberculosis, which has been credited with mysterious virtues. Upon analysis, we see that it has a fixed ratio of the foodstuffs; namely, 1.5 grams protein to 2.7 grams fat to 4 grams carbohydrate. This ratio appears to be an essential characteristic of the diet; yet it is without any scientific rational. Furthermore the diet imposes certain restrictions in the mode and preparation of the food, which seem arbitrary, empiric and unsupported by scientific logic. The chief virtue of this diet is to bring home to our attention the necessity for avoiding fads in the treatment of tuberculosis and to adhering to sound principles of nutrition and therapeutics.

Summary.

1. Nutrition and tuberculosis are intimately interrelated.
2. A faulty state of nutrition is one of the predisposing causes of tuberculosis.
3. American diets need further study.
4. The normal diet is one which protects the individual from deficiency diseases and which supplies the physiologic needs of the body. It contains eight essentials: namely, energy, water, carbohydrate, protein, fat, salts, vitamins, and roughage.
5. A deficiency diet is any diet which contains less than the minimum requirement of each essential.
6. Sanatorium care of the tuberculous gives rise to special problems in nutrition.
7. There are no trick diets in tuberculosis. Mysterious sounding diets should be checked by standard principles of nutrition.

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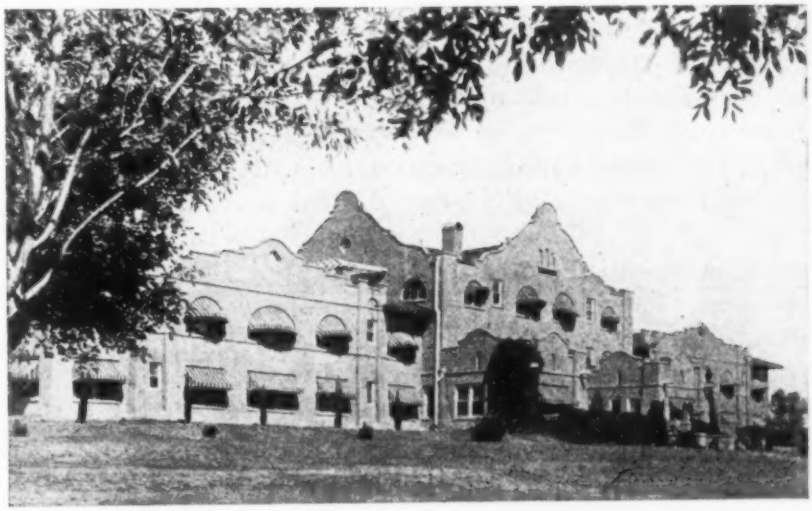

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THE CONSIDERATION OF PATIENTS FOR THORACOPLASTY—(Continued from page 10).

tions of the ribs below this, these lower nerves are crushed to get temporary paralysis since their permanent destruction often leads to distressing prominence of the abdominal muscles on that side. This multiple intercostal neurectomy suplementing the thoracoplasty accomplishes two things. It removes the possibility of pain on that side of the chest. By paralyzing the intercostal muscles it minimizes the respiratory motion on that side. Yet, often the pain has been in the back along the spine or even on the opposite side. This we are convinced is due to incorrect posture. We are auticipating this at present by the construction of a brace with its points of support on the crest of the ilium and axilla so that during the months following thoracoplasty the position of the thorax and the head and neck upon it are maintained in their proper relationship.

We must recognize, then, that:

1. Thoracoplasty does not cure nor stop rapidly advancing caseous pulmonary tuberculosis. But,

2. That in essentially unilateral involvement where there is definite evidence of attempts at fibrous tissue limitation of the tuberculous process, arrest of the disease and negative sputum can be expected following the present day type of thoracoplasty in more than eighty per cent of the cases.

These people with so-called cures are improved, it is true. They are able to leave their sanatoria, return to their homes, and resume work of a sedentary character. However, they have not been returned to health. To a varying degree they are absorbing from chronic bronchiectatic areas within the collapsed lung. Their postures are incorrect. With or without exertion they have pain. In consequence, they fatigue easily and, as the day advances, become more and more conscious of shortness of breath. They are the victims of pus, posture and pain.

By collapse of the chest wall comparatively early in pulmonary tuberculosis, by constant and intelligent attention immediately following thoracoplasty to the posture of the patient both before he is out of bed and by properly fitted braces afterward, by the division of the intercostal nerves close to the transverse processes the author is very confident that we shall change these so-called cures with negative sputum but poor health into men and women who can resume to a very considerable extent moderate and sustained activity eight hours a day without fatigue, discomfort or mental depression. When every physician who finds that the surgeon during his thoracoplastic work can be depended upon with his assistance to accomplish this in eighty per cent or more of his patients then, with our present knowledge of the great advantage of early thoracoplasty in pulmonary tuberculosis that has not responded to all less radical procedures, we can tell not only the patients ill with tuberculosis for many years, but those who have suffered only a comparatively few months that their chance of return to approximate health by this procedure is not only reasonably safe, but reasonably sure.

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THE MANAGEMENT OF PULMONARY TUBERCULOSIS—(Continued from page 15).

the question of contact in individual cases this may be extended indefinately.

In closing I should like to suggest the possibility of the use of this type of routine with appropriate modifications in a variety of diseases. Too frequently the directions given to patients regarding exercise are so sketchy as to be of little help. It is of distinct value to have some definite series of steps in mind by which the patient will be returned to normal activity. The speed with which each increase is instituted will always be a matter of judgment and individualization.

AMBULATORY PNEUMOTHORAX IN PULMONARY TUBERCULOSIS—(Continued from page 19).

office for fluroscopic x-ray examination and office pneumothorax treatment. The percentage of arrestments, improvements and deaths were practically the same in my home group as in the sanatorium group, but I still advise every patient who can go to a sanatorium to go, for the first few months of his pneumothorax treatment in order to get the sanatorium training. In occasional instances such as case number II, where the entire financial future may be jeopardized, I believe we are justified in allowing a patient to return to work in from four to eight weeks, but I feel that the average case should take pneumothorax for quite a number of months before resuming work.

Summary

Artificial pneumothorax used with patients in all stages during the past six years has produced recovery in over 70%.

Pneumothorax allows most patients safely to become ambulatory in a comparatively few months.

Every physician seeing a tuberculous case should consider the possibility of immediate pneumothorax treatment, either in a sanatorium or at home, as many early patients treated by this method can safely return to work in a few months.

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HOME INFECTION IN TUBERCULOSIS AND HOW TO NEUTRALIZE ITS DANGERS—(Cont. from page 17).

mon use of knives, forks, cups, saucers, etc., without thorough cleaning.

It seems to me that a still more intensive effort might be made to bring these points to the notice of persons leaving sanatoria or hospitals and of those infected patients with families attending at tuberculosis institutes and dispensaries for advice and direction; and that general practitioners might become, to a still greater extent than at present, apostles in a movement to diminish the risk of home infection as it bears on the infants and young children destined to be the citizens of to-morrow.

It is a mistake to frighten the general public by always dangling before their eyes the bogey of tuberculosis. To many of them the risk is non-existent, and constant "nagging" only leads to weariness and apathy. But in the case of infected persons actually capable of spreading the disease through their own carelessness or through the omission of precautions which may well be within their power, the campaign of education can hardly be too intense. At the same time it must be on practical lines, and it must take into account the actual circumstances of the particular home in question. Very little is likely to be accomplished by eloquent exhortation, but a great deal may be done by discussing in a friendly and helpful spirit the exact circumstances of the patient during a visit to the home, and indicating tactfully what is possible under the circumstances. Judicious help of a material or financial kind may sometimes be necessary to give effect to the recommendations made, and here the funds of after-care organizations may be of great assistance; but much can be accomplished by tact and kindness, which cost nothing and are often of infinite value.

The opinions I have expressed may well be regarded as superfluous in many well-organized areas, where tuberculosis physicians, general practitioners, health visitors, and care committees are already accomplishing wonders on the lines suggested; but few will deny that there are many places where a great deal remains to be done.

Tuberculous persons are the one great source of danger in the spread of tuberculosis. What I advocate is that they may be converted into the front-line troops in our campaign, accepting, as soldiers should, the discipline, the self-abnegation, the constant vigilance exacted from them as the price of victory.

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